

# Turning Around the Turn-Arounds: Improving ED Throughput Processes

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Emergency departments all over the United States are challenged with long waits, increasing hours of diversion, crowding, and struggles with patient satisfaction and staff morale. Forty percent to 50% of emergency departments in the United States are experiencing capacity issues resulting in overcrowding.<sup>1</sup> Given that ED utilization has increased 26% in the years between 1993 and 2003, an increase of more than 2 million visits per year, and that during these same years, the number of emergency departments has decreased 12.3%, there is little question that challenges in managing ED access and utilization are confronted daily. The mean wait time to see a provider in an emergency department in the United States is 46.5 minutes, and the mean length of stay is 3.2 hours.<sup>2</sup> Furthermore, the landscape of U.S. health care presents a disparity in some of the most essential measures. For instance, U.S. health care is number 1 in cost and the percentage of uninsured but number 35 in customer service, and sadly, number 25 in infant mortality. Certainly those who deal daily with these challenges were not surprised when the Institute of Medicine released its study on emergency care with the descriptor: "At the breaking point."<sup>3</sup>

Holston Valley Medical Center in Kingsport, Tennessee, is a 544-bed tertiary medical center in northeast Tennessee with a 45-bed emergency department and a level I trauma center. The volume of ED visits in 2006 was 76,398, a 12% increase compared with the previous year. With the volume increase, this emergency department was experiencing prolonged throughput times and length of stay, increasing ambulance diversion hours, as well as large numbers of patients being sent to the waiting room. In the summer of 2005, the ED leaders and key staff members at Holston Valley Medical Center

began a focused effort to improve throughput processes and to better manage overcrowding in the emergency department. Coinciding with this effort was a renewed dedication to patient satisfaction as well as the double-digit volume increase. With the assistance and support of senior management, contributions of staff, and the resolve to change process and culture, interventions to streamline arrival to bed and arrival to provider and to reduce the number of patients sent to the waiting room were set in place.

ED access is a process-rich environment. Upon examining the generic approach to treatment in any emergency department, one quickly identifies the following essential steps: (1) arrival, (2) sign-in or registration, (3) triage, (4) access to treatment area, (5) access to provider, (6) diagnostics, (7) interventions, and (8) discharge; in addition, there are definitely more steps if consultation, observation time, and transfers are warranted. Upon using a flow chart to determine the arrival process, the team found 8 steps from arrival to treatment (Figure 1) and began to look at improvement opportunities regarding arrival and placement in treatment area.

In managing ED access, it is paramount to design a spreadsheet of essential metrics so that the steps in the process can be measured frequently and consistently. Table 1 lists some of the essential metrics to be included in the efforts to redesign and improve processes. These metrics are reviewed daily to maintain focus and plan actions and changes. Initially, the process of being metric driven was daunting, because much was done manually, but within a very few weeks, it became obvious that measures were necessary to craft meaningful strategies. The metric “admits from the waiting room” indicates the number of patients who eventually were admitted but were placed in the waiting room upon arrival.

With guidance gained from these metrics, changes were made in the registration process, triage, fast-track processes, communication, chart review, admit holds, and diagnostics. The following is a brief description of changes made in each of these categories.

### Registration

A “quick reg” was begun upon arrival. This quick registration captured only name, chief complaint, date of

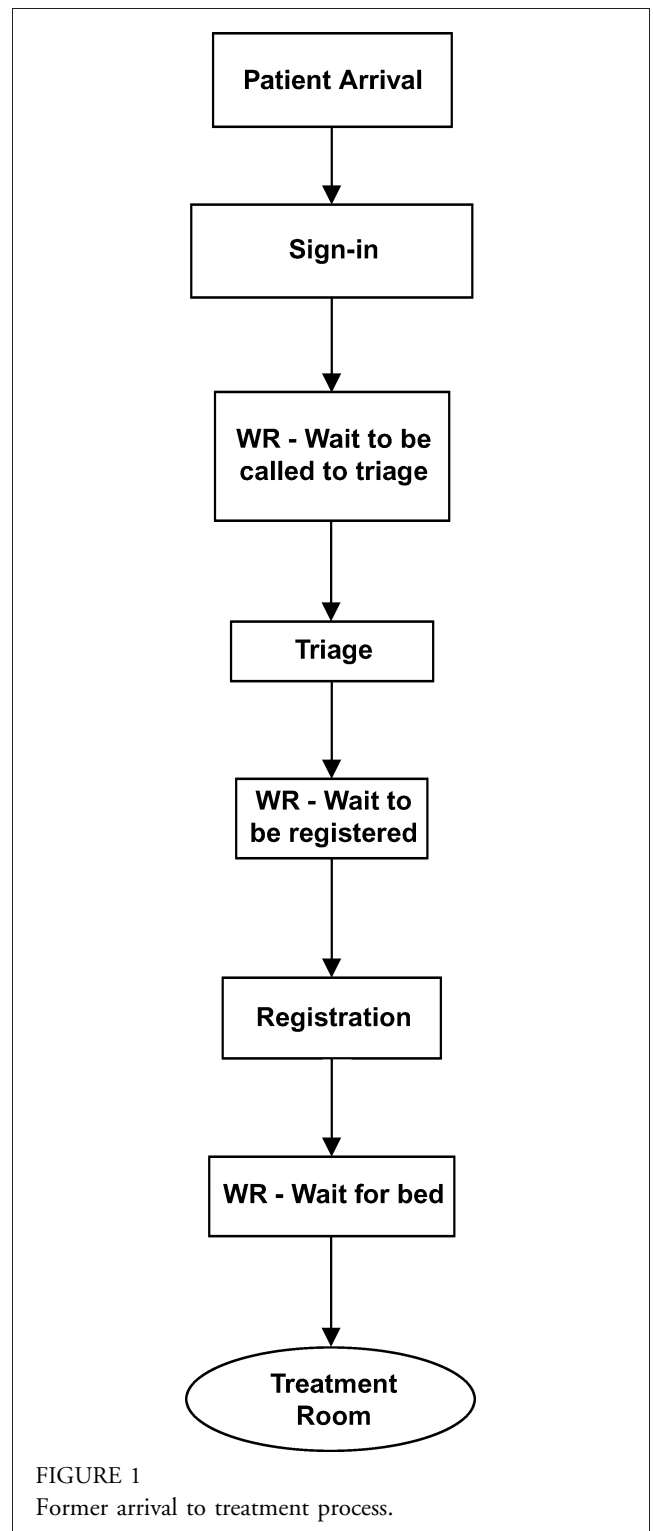


TABLE 1  
Essential metrics

- Total volume
- Volume: admit and discharged
- Arrival time
- Quick registration time
- Full registration time
- Quick registration to full registration time
- Time to bed
- Time to provider
- Overall turnaround time
- Turnaround time for admitted patients
- Turnaround time for discharged patients
- Average patients per day
- Left before being seen
- Left before treatment completed
- Laboratory tests—order to result
- Radiology—order to result
- Arrivals by hour
- Number of patients to waiting room
- Percentage of patients to waiting room
- Admitted patients from waiting room
- Pain metrics: No. with score >5 and time received pain medication

birth, and Social Security number. The quick reg replaced the old “sign-in” list, which was not only cumbersome but a confidentiality concern and oftentimes not accurate as far as time of arrival. The quick reg also put the patient “in the system” so that orders and diagnostics could begin. The birth date and Social Security number were obtained only for the purpose of comparing with previous records for retrieval of additional patient information and for positive identification. Quick reg serves to get the patient to a provider sooner. Full registration follows quick reg and is done at the bedside by a registration clerk. Subsequently, bedside registration was instituted in all care areas (fast track, trauma, and acute care).

### Triage

Triage (noun) is defined as “The process of prioritizing sick or injured people for treatment according to the seriousness of the condition or injury.”<sup>4</sup> Triage is not defined as assessment, history, teaching, or meeting regulatory requirements, activities that have been added to

triage. These activities can be completed in the treatment area. A negative impact ensues if triage time is spent accomplishing activities that are not “triage.” Assessments and histories, as well as required questions regarding education, nutrition, home medications, travel history, exposure to contagious diseases such as tuberculosis, and domestic violence can be done in the treatment area once the patient is placed in a bed. By “triage, only triage,” and not adding other activities that defeat the timeliness of triage, the number of patients going to the waiting room can be reduced and arrival to bed time can be decreased.

A second nurse was added to triage during peak hours (2 PM-10 PM) for the purpose of separating the fast-track patients from acute care patients so that patients could arrive in a treatment area sooner. The time for double-triage coverage was determined by looking at the arrivals by the hour metric. Sorting of patients is done by chief complaint, consideration of age, vital signs, and clinical presentation. When beds are open, patients bypass triage and go directly to the treatment area. The activities of getting the vital signs, allergy information, and other pertinent questions can be completed in the treatment room. When beds are not available, fast-track patients go to a fast-track “sub-wait” area in the back. By sending patients to the sub-wait area, the number going to the general waiting room is drastically reduced and the patients are placed closer to the treatment room. Additionally, this same sub-wait area serves a dual purpose: it also is used after treatment for patients awaiting results of laboratory tests or radiographs, for patients who have received some medications, or for patients who are awaiting transportation home. These areas were created by simply moving several chairs into appropriate hallways. When acute-care beds are not available, patients are placed on a stretcher in the hallway until a bed is open. Folding screens were purchased to provide privacy in this temporary setting.

Finally, the number of standing orders and preemptive diagnostic guidelines were expanded so that care could begin upon arrival. These standing orders include urinalysis, radiographs, panels, pregnancy tests, and treatment for pain and fever.

### Fast Track

Keep it clean! Dedicate the fast track to fast-track patients. Resist the temptation to go the default mode of the “only

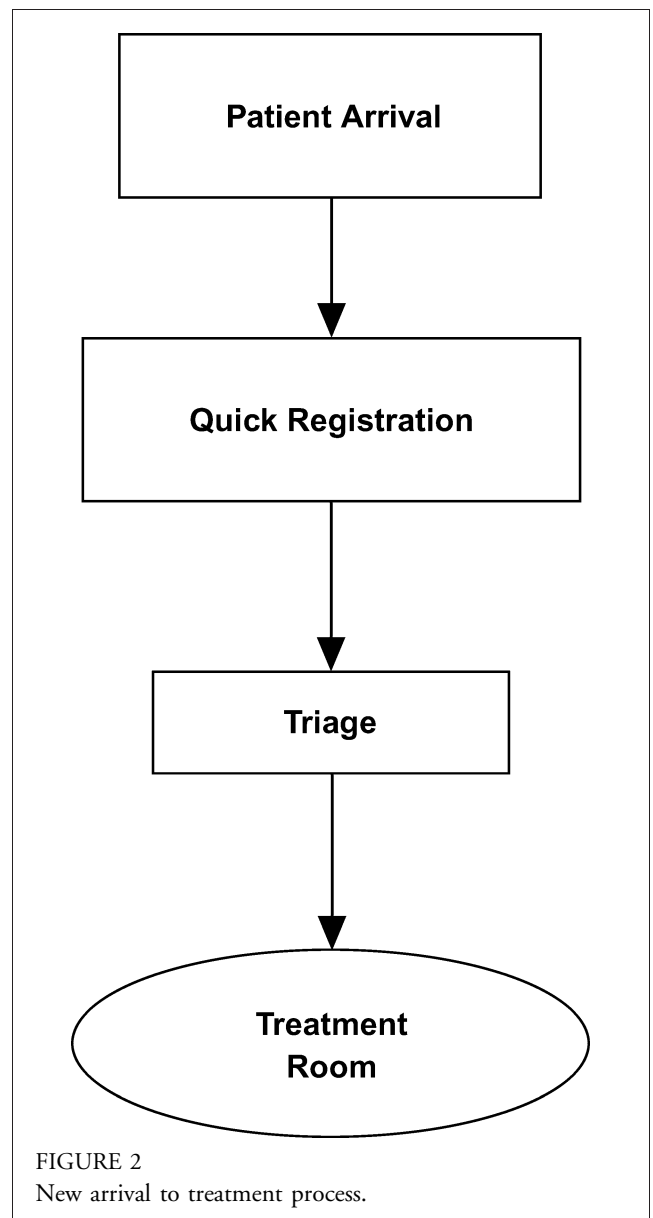
empty bed” and put inappropriate patients in fast-track beds. The inappropriate allocation of fast-track beds creates bottlenecks in fast-track flow. These patients may occupy a bed for an inordinate amount of time, which may create an unsafe situation for the patient and cause undue frustration for the staff, because fast track is not optimally equipped to care for acutely and critically ill patients. Instead of occupying the “last bed” in fast track, patients who should be cared for in an acute care setting are placed temporarily on stretchers in the hallway and screened for privacy. As soon as an acute care bed is available, the patients are moved from the hallway.

An “express treatment” room was created in which patients are seen either by a physician or nurse practitioner. The end of a hallway is used for express treatments such as prescription refills, some sunburns, some rashes, toothaches, earaches without fever, and simple headaches. These patients can be in and out within minutes and never occupy a conventional treatment room.

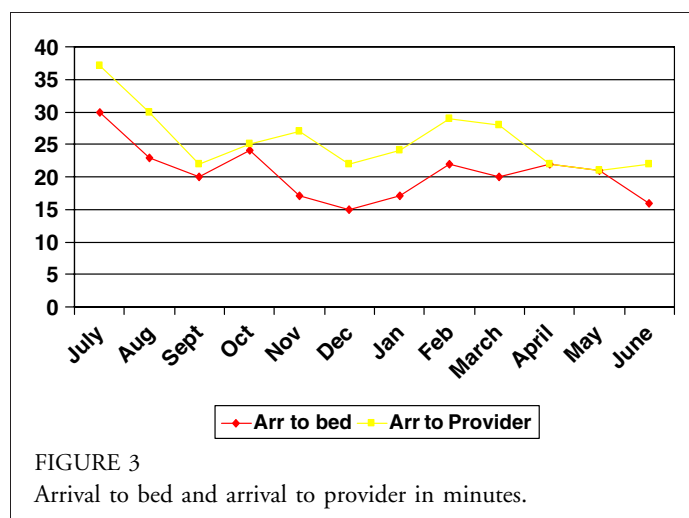
#### Admit Holds

To accurately identify problem areas, it is imperative to know admission metrics, especially admit holds by the hour, number of admits from the waiting room, and length of stay for admitted patients, by type: medical-surgical, pediatrics, and critical care. Even though drastic changes occur in process and ED throughput, unless inpatient capacities are matched, patient flow barriers continue for those admitted when inpatient beds are not available. Two major changes were put into place to deal with admit holds. One was the creation of an admit team. This team is composed of 2 registered nurses (RNs) per staggered 12-hour shift, covering ED admissions 10 AM to midnight. The admit nurses are under a separate cost center but are cross-trained to work in the emergency department during times of surge census. Once the ED patient is admitted, the admission nurse comes to complete the admission process, start computerized documentation, and start inpatient orders, thus freeing the ED nurse to care for incoming ED patients and helping meet the requirements of same level and continuity of care for admit holds as that of inpatients. When the inpatient bed becomes available, the admission nurse calls report and in some cases transports the patient.

The second major entity was the creation of an admit-hold unit. This area was renovated from adjacent office



space and was designed to house medical-surgical and step-down level patients waiting more than 2 hours for an inpatient bed. EKG monitoring is available for any patient for whom it is required. The admission team nurse moves the patient to the admit-hold unit if the acquisition of an inpatient bed is delayed beyond 2 hours. The admit-hold unit is located in a secluded area of the emergency department and includes accommodations for family members, such as a chair that converts to a sleeper. In the event of absence or vacation of the admit nurse, the ED nurse manages the admission but may move those patients waiting for a



bed longer than 2 hours to the admit-hold area to be placed in the care of staff there. The admit-hold staff are cross-trained to work either in the emergency department or the admit-hold area.

### Diagnostics

In addition to adding some preemptive diagnostics, the following changes were made in laboratory and radiology processes:

- A “draw-label-send” process was begun in acute care, so that by the time the physician sees the patient and orders laboratory tests, the specimen is in the laboratory awaiting the order. Lavender, green, blue, and marble tubes of blood are drawn and sent to the laboratory upon the patient’s arrival in acute care, prior to the physician order, and much of the time, prior to the physician seeing the patient. Routinely, specimens for blood counts, blood chemistry, coagulation panel, and type and cross-match are sent via draw-label-send methodology. The tubes are labeled in the emergency department with the label from the patient’s chart and laboratory labels are printed as the specimen is being sent to the laboratory, thus making the laboratory label ready when the specimen arrives in the laboratory. The difference in this method compared with the “draw-label-send-hold” tactic is that the specimen is placed in centrifuge as soon as it arrives in the laboratory, saving 5 to 10 minutes of preparation time. The laboratory staff

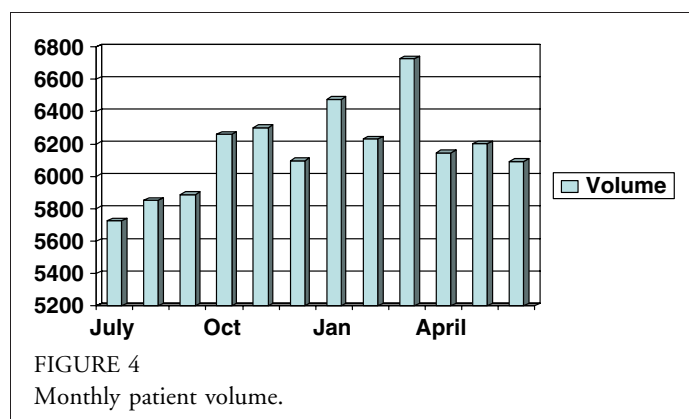
were enthusiastic to partner with the ED staff in this process improvement, because they too had developed metric-driven goals to improve turnaround times.

- A tabletop laboratory was set up in fast track to perform simple, high-volume tests: urinalysis, urine pregnancy tests, and flu screens in season.
- The pneumatic tube system priority was upgraded 3 levels to elevate the priority of laboratory specimens being delivered to the laboratory from the emergency department.
- Point-of-care cardiac markers were instituted in acute care, which led to results for troponin, myoglobin, creatine phosphokinase-MB, and beta natriuretic peptide within 15 minutes.
- Radiology changes include prioritizing radiograph requests into 3 “buckets”:
  - True stat in the “first bucket”
  - Fast track in the “second bucket”
  - Those who will be in the emergency department for a while in the “third bucket”

Additional steps taken to improve throughput processes include emphasizing communication among treatment areas, especially between fast track and the waiting room, daily chart review with peer counsel, and cross-training the staff in certain functions.

### Communication

Staff were re-educated regarding vigilance of the ED tracking board for the purpose of consistently being aware of



what types of patients were arriving, arrival times, and times in the waiting room. The triage nurses were encouraged to increase the communication by making frequent calls to the treatment areas to advise of wait times, bed status, the need for triage back-up, and when patients needed to be taken back. The charge nurses were equipped with portable phones, and a half wall was taken down to provide visibility from the registration area to the triage area.

#### Chart Review and Peer Counsel

Daily chart review was undertaken with peer groups among the physicians and nurse practitioners. All charts for patients who wait more than 40 minutes from the time of arrival to seeing a provider are reviewed daily. The goal of daily chart review is to discover reasons for these outliers and to create a learning opportunity from real-time review and conversation. Nursing was the driving force for chart review, and initially the ED manager and fast-track charge nurse conducted the chart reviews. As the benefit of daily chart review was demonstrated, physicians joined the effort. The concept of chart review is to identify each chart that falls outside the metric for arrival to bed and arrival to provider. Upon reviewing these “outlier” charts, the question of why the delay occurred is posed, options and barriers are discussed, and strategies to improve are brainstormed.

#### Cross-Training of Staff

Additional cross-training was done with some staff. All nursing staff members are cross-trained in simple respiratory adjuncts and procedures, such as incentive spirometry and suctioning, and in application of simple orthopedic

devices. Patient care technicians are trained to do EKGs and phlebotomy.

#### Outcomes

Figure 2 depicts how process changes affected patient arrival and placement in a treatment room. The process was streamlined from 8 steps to 3 steps. Ultimately, these changes have resulted in fewer patients being sent to the waiting room and a decrease in arrival to provider time. Outcomes from these process improvements are:

- Patients sent to the waiting room decreased from 15.7% to 3.6% of patient volume, a 75.4% reduction in number of patients sent to waiting room
- A 46.6% reduction in arrival to bed time
- A 40.5% reduction in arrival to provider time
- A 14.5 % reduction in length of stay for discharged patients

Simultaneously, there was an increase in volume of 12%. Figures 3 and 4 illustrate the results of improved throughput processes and volume growth.

The rewards of decreasing ED throughput times are real and tangible. Patient satisfaction correlates with time to be seen and with length of stay. Overall, ED patient satisfaction as measured from Press Ganey surveys increased from 72% in the first quarter of 2006 to 97% in the second quarter of 2006. Lastly, improving throughput times is a much easier and less expensive method of increasing capacity versus bricks and mortar. The hard work and intense focus by many has been rewarded with greater patient focus, improved throughput times, easing of overcrowding, and enhanced patient satisfaction.

## Looking Back

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Retrospectively, the change processes that served as the vehicle for these improvements were multifaceted. Alterations involved physical changes, process changes, and logistical changes. One of the more apparent changes was the addition of 6 full-time equivalent positions to provide double triage coverage during peak hours and the admission team nurses. The process changes described in this article took place over 12 months, but the improvement process is not complete. We continue to measure, adjust, experiment, and evaluate changes in the process to render improvements.

An example is the recent conversion of a conference room to a dedicated fast-track registration and waiting area. The challenge of engendering ownership, enthusiasm, and buy-in among staff and physicians is ongoing. Some methods proven to win support is to charter staff to map the changes with small task forces, identify the champions of the change process and put them in the place to influence their colleagues, and share and celebrate improved metrics and much improved patient satisfaction scores.

At the end of the day, the improvements made, which have provided improved patient care and satisfaction, and more efficient processes are the true rewards for worthwhile work.

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